



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

February 13, 2007

The Honorable Naida L. Kaen, Chairman
Science, Technology and Energy Committee
LOB 304
Concord, New Hampshire 03301

Re: HB 415FN, relative to establishing a geothermal assessment project

Dear Chairman Kaen:

Thank you for the opportunity to comment in support of HB 415FN. This bill would charge the state geologist with conducting a geothermal assessment for the state of New Hampshire. The Department supports the goals of this assessment, which would be timely in light of the developing national consciousness toward making the nation less reliant on foreign sources of energy. The development of clean, efficient energy systems is consistent with the Department's mission of protecting the environment. In addition, this program would contribute to the Governor's goal of having New Hampshire produce 25% of its energy needs from renewable sources by 2025. As stated in the Fiscal Note, however, a geothermal assessment project with the elements described in HB 415-FN could not be accomplished without hiring additional staff, specifically a senior hydrogeologist and a part-time technician. In its current form, the bill does not authorize the Department to establish these new positions and does not authorize funding to conduct the required assessment. The Department takes no position on whether the Legislature should provide funds for this purpose.

The use of geothermal energy has captured the imaginations of New Hampshire citizens for decades. A preliminary assessment of geothermal potential for the U.S. was conducted in the 1970s, and New Hampshire was identified as the one of the northeastern states with the greatest potential. In 1975, the US Energy Research and Development Administration (now known as the Department of Energy), funded the drilling of an exploratory drill core to a depth of 3002 feet to characterize in detail the composition and geothermal gradient near Conway, NH. The results were inconclusive because the boring unexpectedly penetrated an undesirable type of rock that is not associated with advanced heat production. The Department of Energy funding waned, but the scientists who designed the original project suggested that detailed mapping combined with additional geophysical studies could help determine new potential sites for geothermal power in New Hampshire.

The term "geothermal energy" elicits images of hot steam coming from the earth that can be harnessed to produce electric energy. It is not likely that there are areas of New Hampshire where the earth's temperature close to the land's surface is sufficiently high to produce steam. However, there are several new technologies that are currently being developed that do not require super-heated, or even boiling water temperature in order to produce geothermally-derived energy. For example, water that has been geothermally heated to 140 degrees can be used for direct heating, if the water is pumped directly through heating radiators to heat the air. Development of direct-use heating water could be a strong draw for industries that need to heat large warehouses, or have drying needs that are part of their industrial processes. The savings in energy costs could be a strong driver for industrial development for New Hampshire, especially

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in northern areas of the state that need economic development. Preliminary estimates show that the North Country looks to be the most promising for direct-heat resources.

Another new emerging technology that has been demonstrated in New Mexico and in France is Dry Hot Rock (DHR), or binary heat systems. These systems involve using organic chemicals that boil at temperatures below the boiling point of water. The pressure produced by the evaporating vapors can be used to drive generators and generate electricity. A recent report produced for the U.S. Department of Energy by the Massachusetts Institute of Technology strongly promotes the development of this technology, and calls for more funding for research and development at the state and federal levels, in conjunction with private industry partnerships.

At a smaller scale, geothermal energy is available to every homeowner in New Hampshire. Geothermal heat pumps—also known as ground source heat pumps or by trade names such as Geoexchange—work by concentrating the naturally existing heat stored in the ground. Beneath New Hampshire, the earth stores energy below the frost line where the temperature of the ground remains a constant 50 degrees Fahrenheit. Geothermal heat pumps utilize this constant temperature to produce heat in the winter and cooling in the summer.

The geothermal assessment outlined in HB 415-FN would charge the state geologist with collecting, analyzing, and interpreting the most recently prepared geological data created by the federal government and university researchers since the last evaluation of geothermal resources took place in the 1970s. In addition, staff would collect geophysical data in the field, such as the temperature at the base of deep (1,000 feet deep) water wells in order to compile data that would elicit, with confidence, areas of the state with enhanced geothermal potential for such uses as HDR or direct-use technologies.

This would be an appropriate task for the state geologist because the state's database of well records resides with the New Hampshire Geological Survey, a unit of the NHDES that is directed by the state geologist. Currently, approximately 100 deep wells are drilled across the state each year that could be used for collecting and measuring heat-gradient information. The results would be compiled into a comprehensive report, and favorability maps for identifying areas best suited for direct-use geothermal, binary, and ground-source heat pumps would be produced and made available to state agencies and the public. This information would facilitate investment from private energy developers, industry, and the public to develop clean, efficient, geothermal energy in New Hampshire.

Please contact me at 271-2958, or State Geologist Dr. David Wunsch at 271-6482 if you have any questions or desire additional information.

Sincerely,



Thomas S. Burack
Commissioner